

Who am I? Where did I come from?

From Africa to Aotearoa – Our story

Lisa Matisoo-Smith
University of Otago

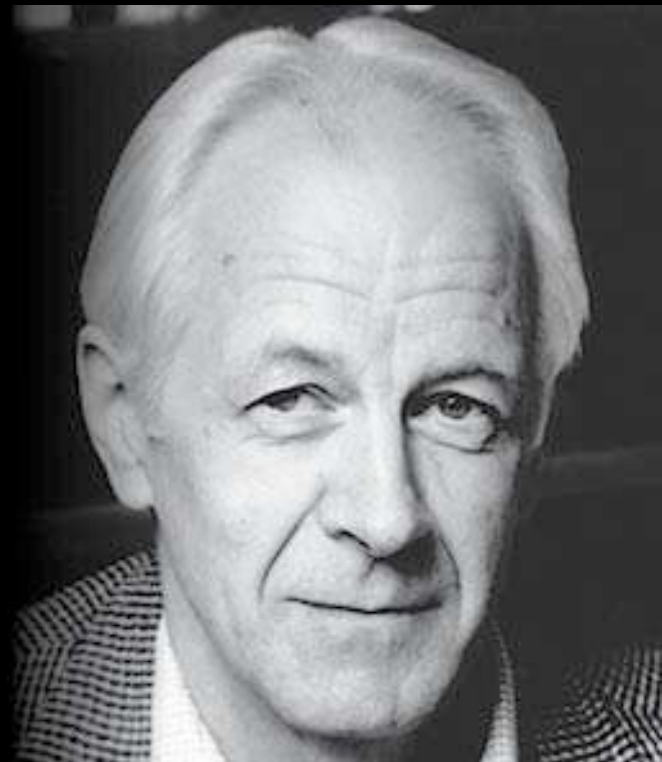


Reconstructing Human Evolution



Allan Wilson (1934 - 1991)

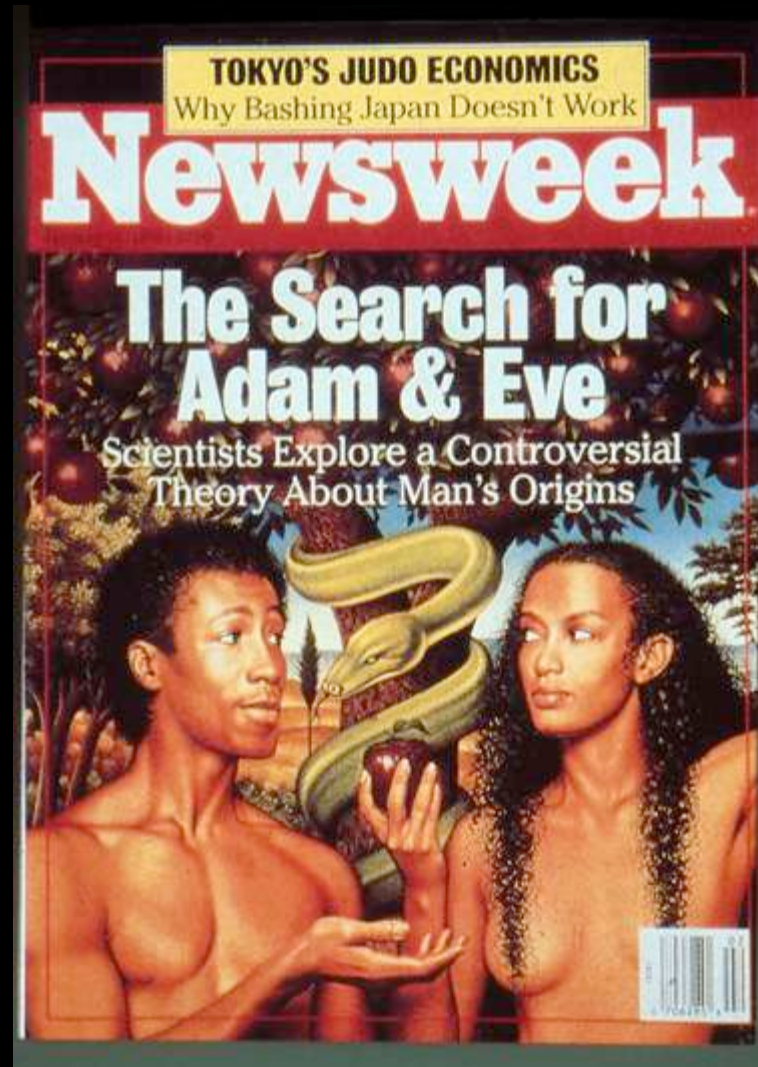
- Born in Ngaruawahia
- BSc Otago
- PhD UC Berkeley
- The Wilson Lab
 - molecular evolution
 - molecular clock
 - mtDNA
 - ancient DNA

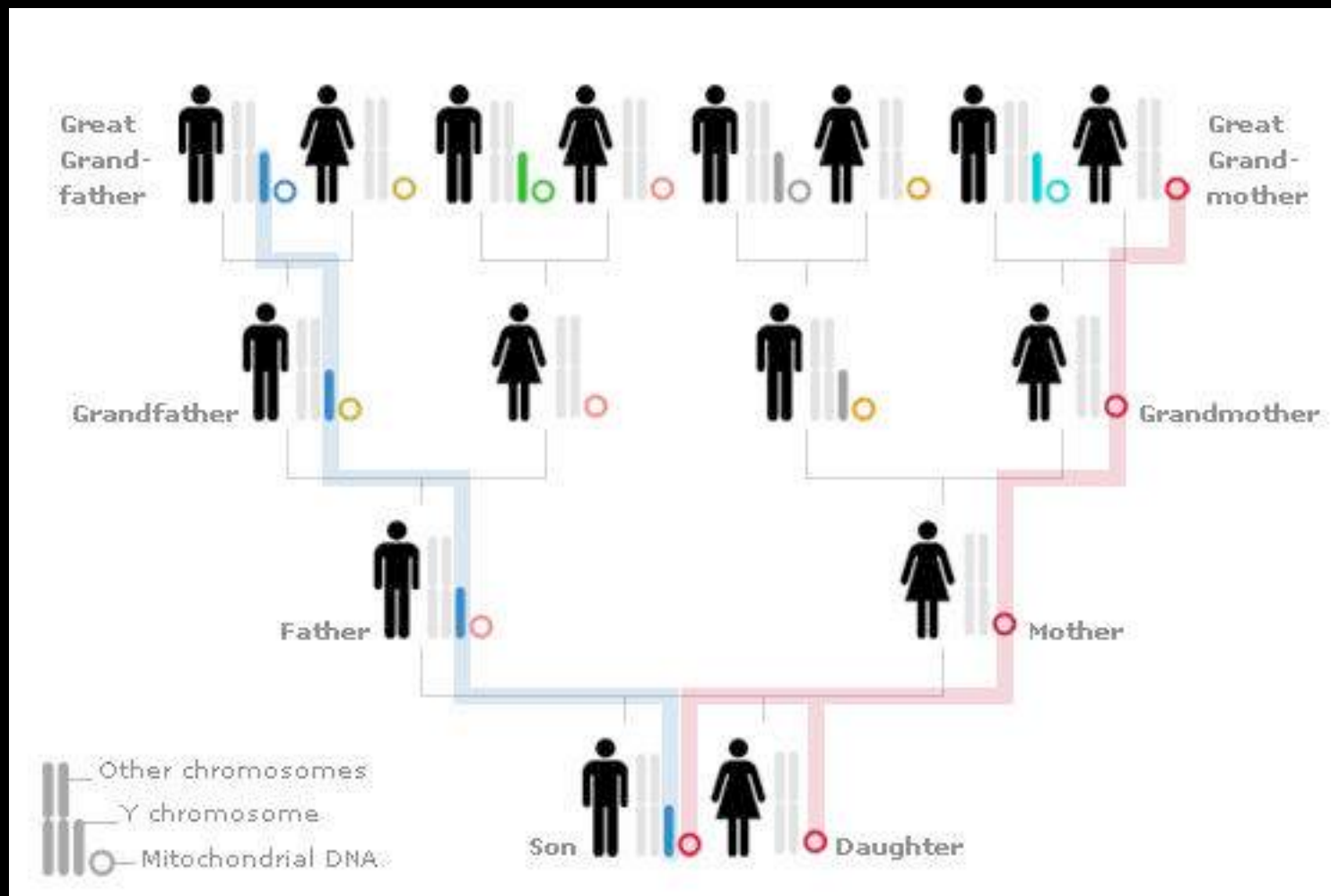


We don't know
if all of those
fossils had
descendants –
but we do
know that we
all had
ancestors....



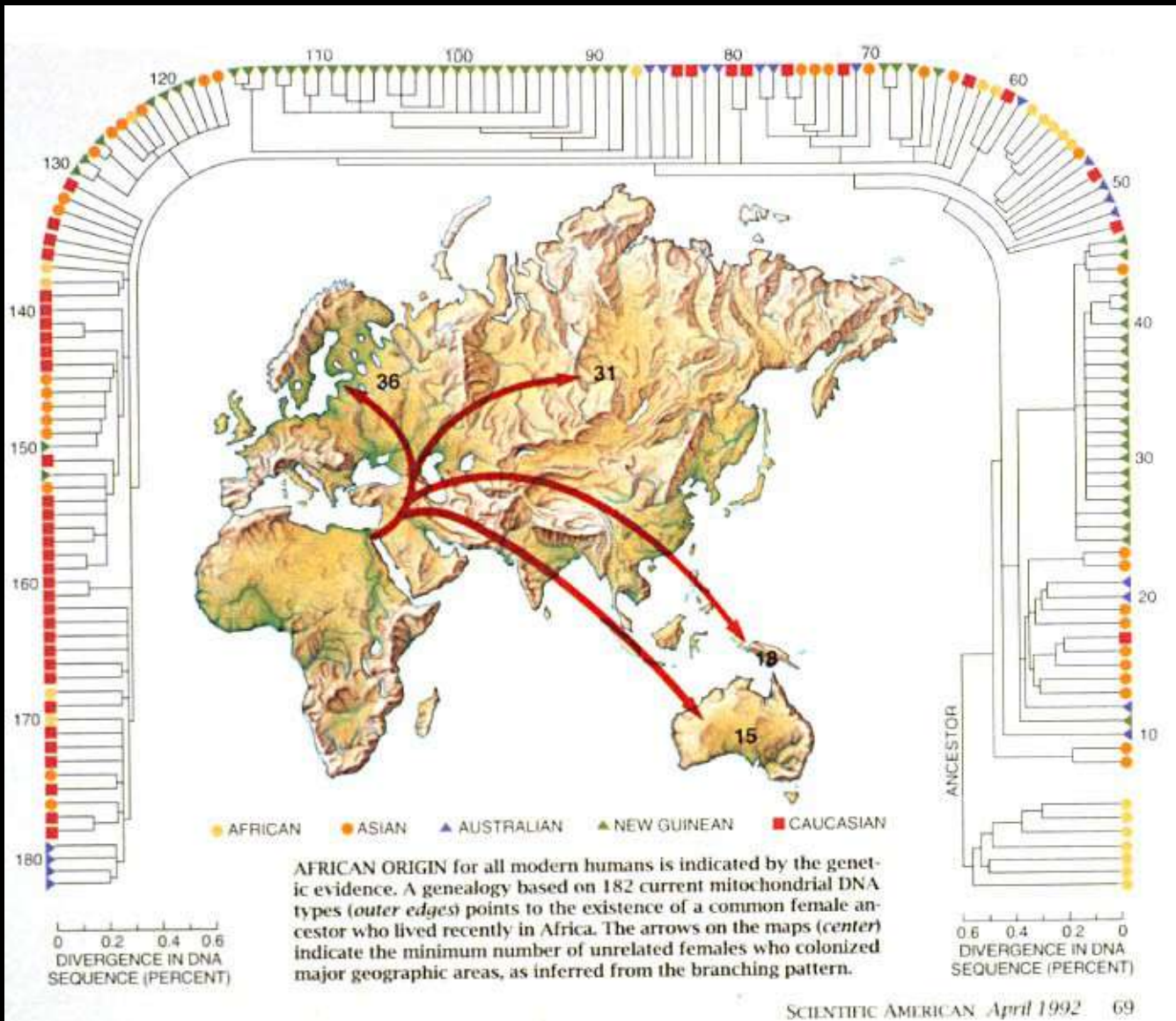
Tracking human migrations through DNA





Mitochondrial "Eve"

based on Cann, Stoneking & Wilson 1987

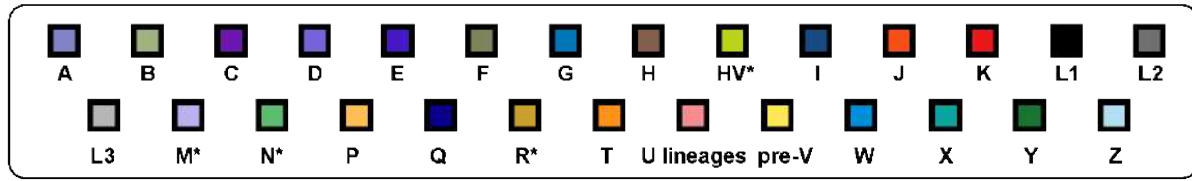
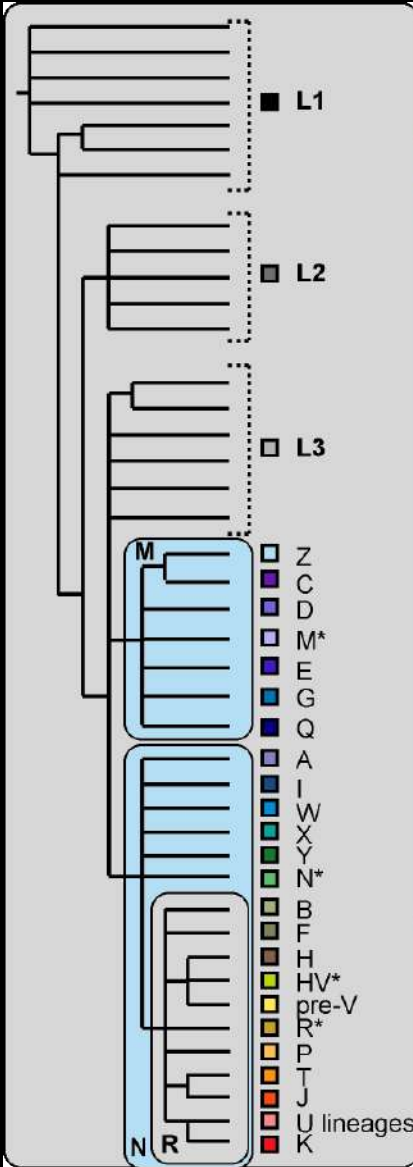
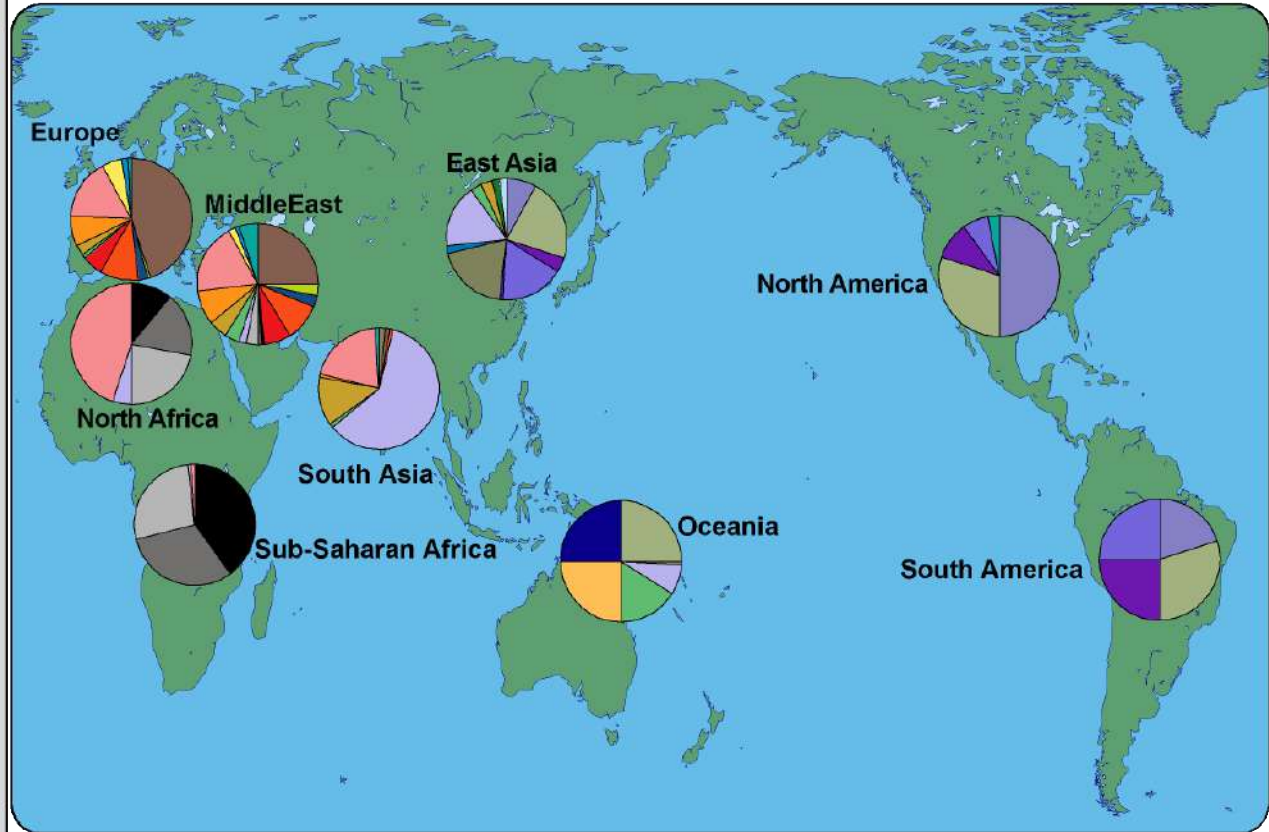


An evolutionary tree from populations around the world based on mtDNA differences.

Traced all lineages to a single maternal line that existed in Africa over 150,000 years ago

Haplogroups

mtDNA haplogroup distribution



Early spread of modern humans from east African source, 60,000 to 40,000 years ago

Later spread of modern humans from west Asian source, 45,000 to 35,000 years ago

Hypothesized east African source area of modern humans, 80,000 to 60,000 year ago

Hypothesized West Asian source area of modern northern Eurasians and north Africans, 50,000–45,000 years ago

Hofmeyer

Haua Fteah

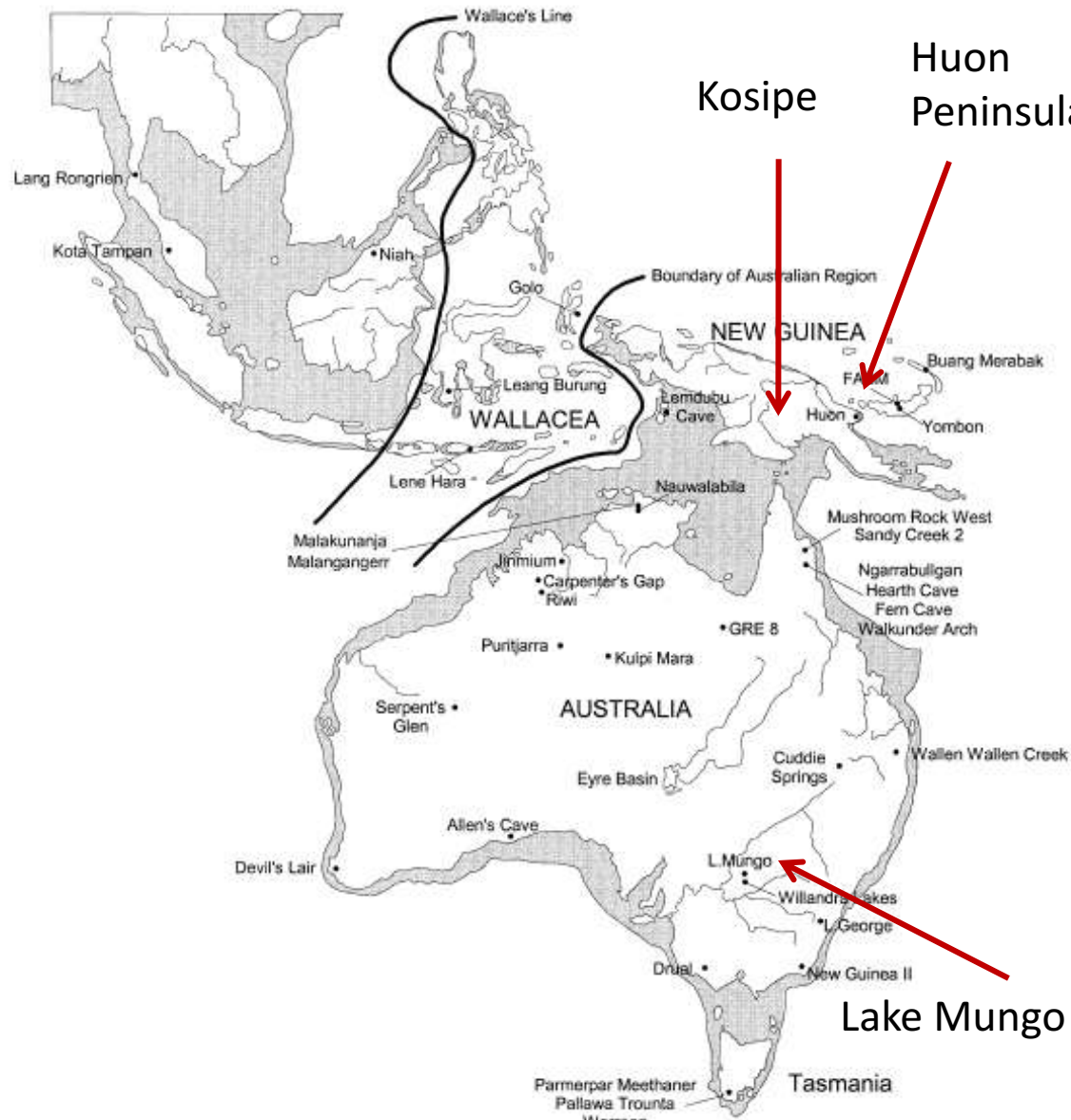
Ksar Akil

Kostenki

CASPIAN SEA

LAKE BAIKAL

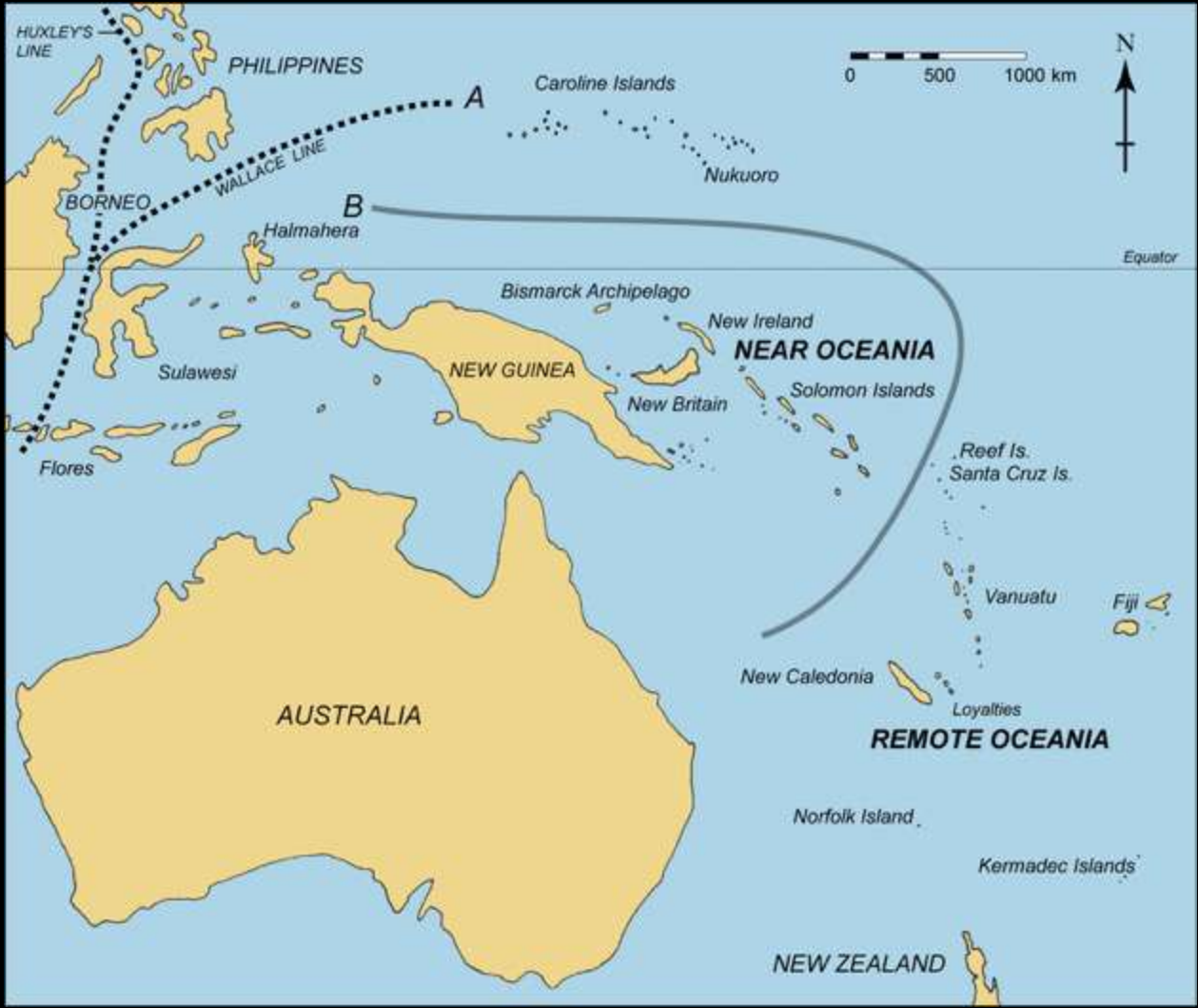
Human pathways. Reconstructed spread of modern humans during the late Pleistocene, and locations of some key early Upper Paleolithic archaeological sites. Grine *et al.*, Olivieri *et al.*, and Anikovich *et al.* provide new evidence confirming that early modern humans spread from southwestern Asia into northern Africa, Europe, and Russia about 45,000 to 40,000 years ago.



Early
Archaeological
sites in
Sahul

Dated from
50,000 BP

Near and Remote Oceania



Holocene sea level rise – 10,000 BP

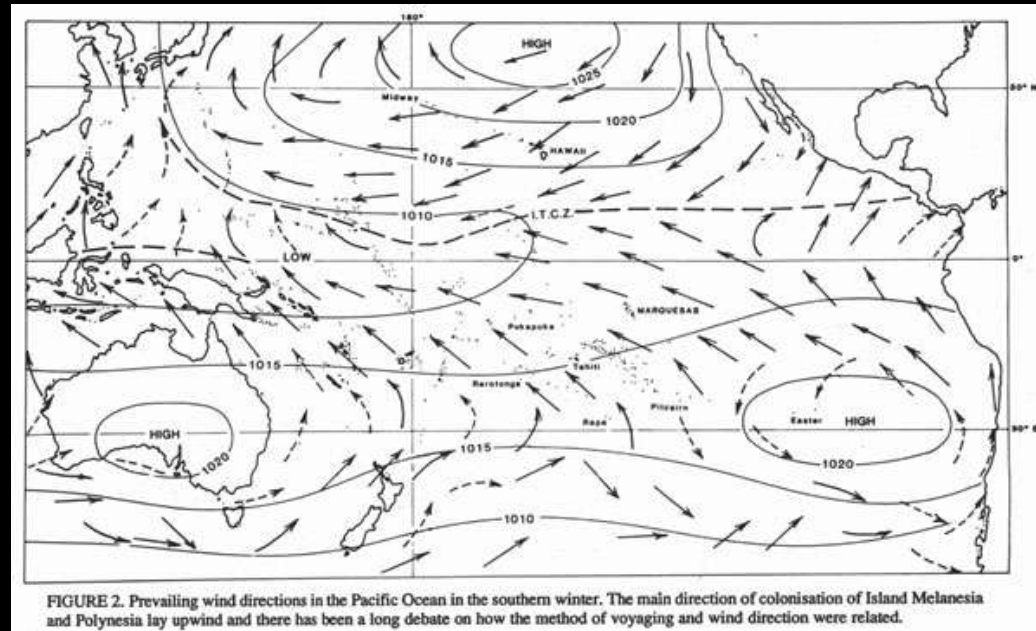
Settlement of Remote Oceania



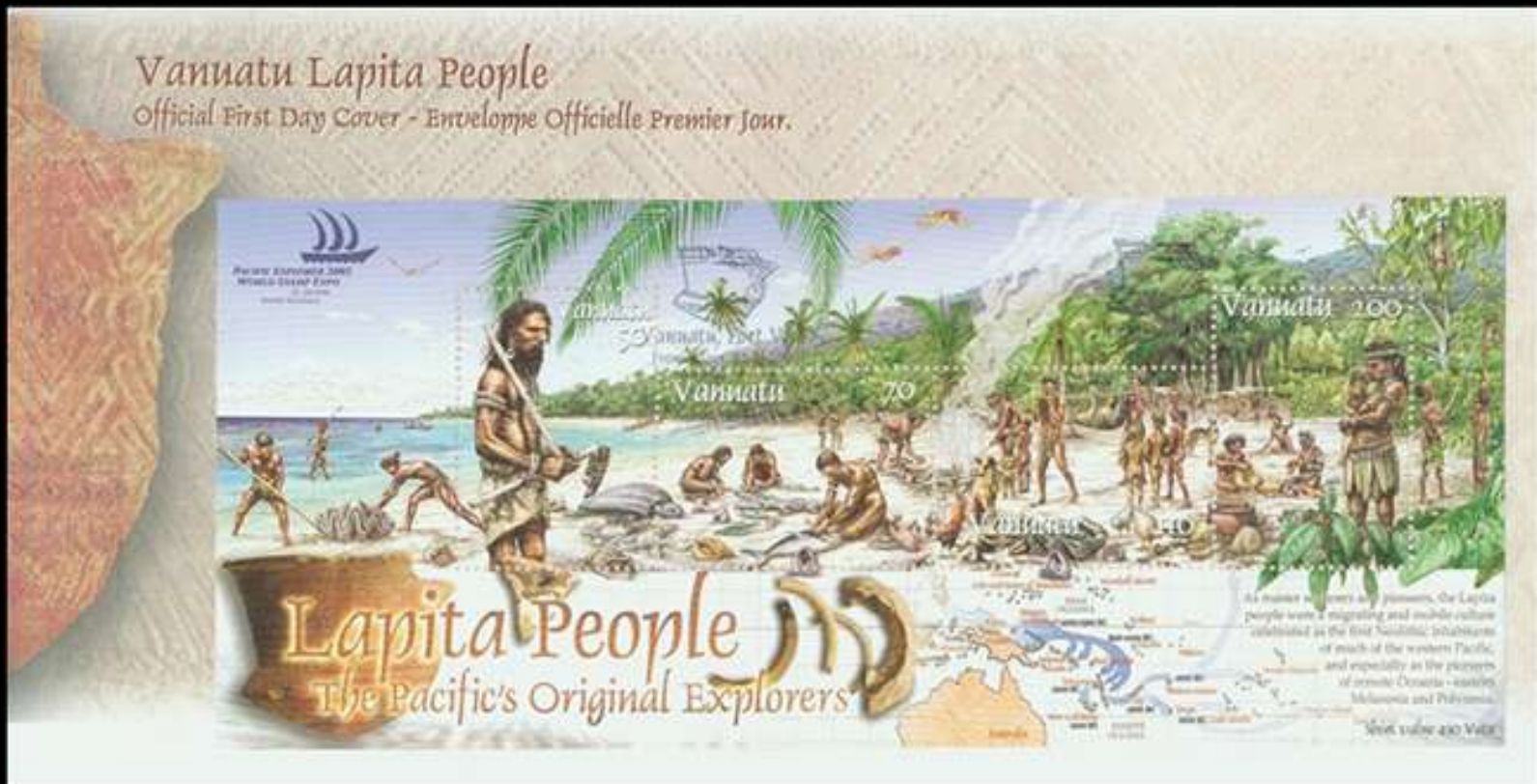
<https://www.nlm.nih.gov/nativevoices/assets/exhibition/section/OB1674.jpeg>

Winds - Sailing against the wind into Remote Oceania

- Safe sailing – return voyaging
- systematic and planned settlement
- no/little loss of life
- difference between exploration and settlement

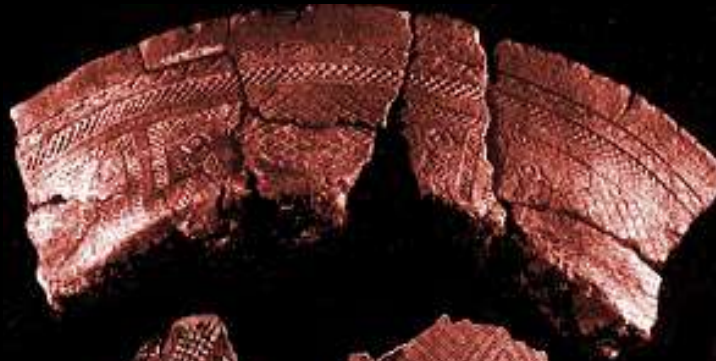


The Lapita Cultural Complex



Lapita sites first appear in the Bismarck Archipelago (New Guinea) about 3350 years ago
They reach Vanuatu by 3000 years ago - stamps above represent the site of Teouma

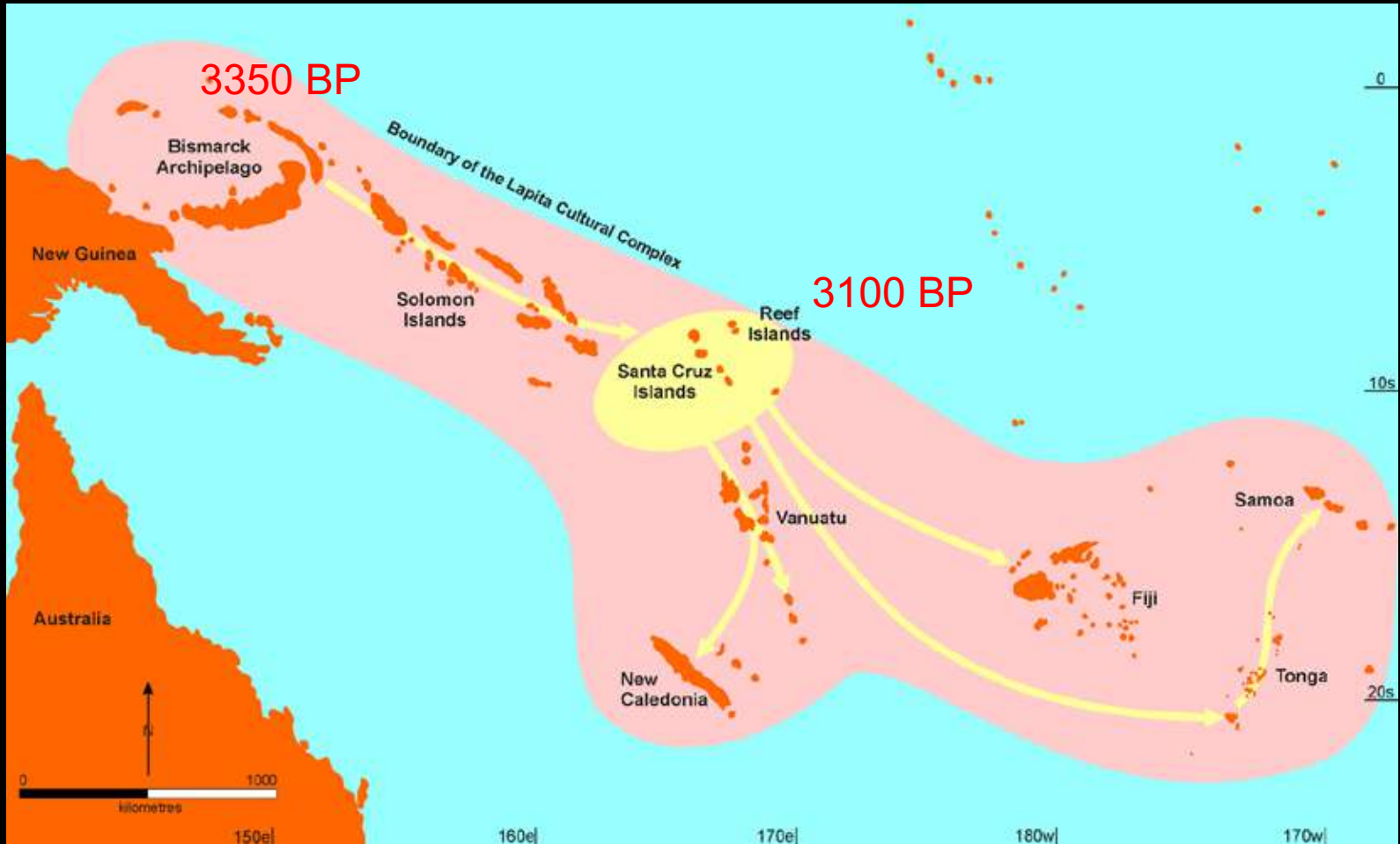
Lapita pottery



Lapita

Decorated pots, undecorated pots, ceramic "faces"
"tattooing the pots"

Lapita Dispersal



Spans Near and Remote Oceania and Melanesia and Polynesia

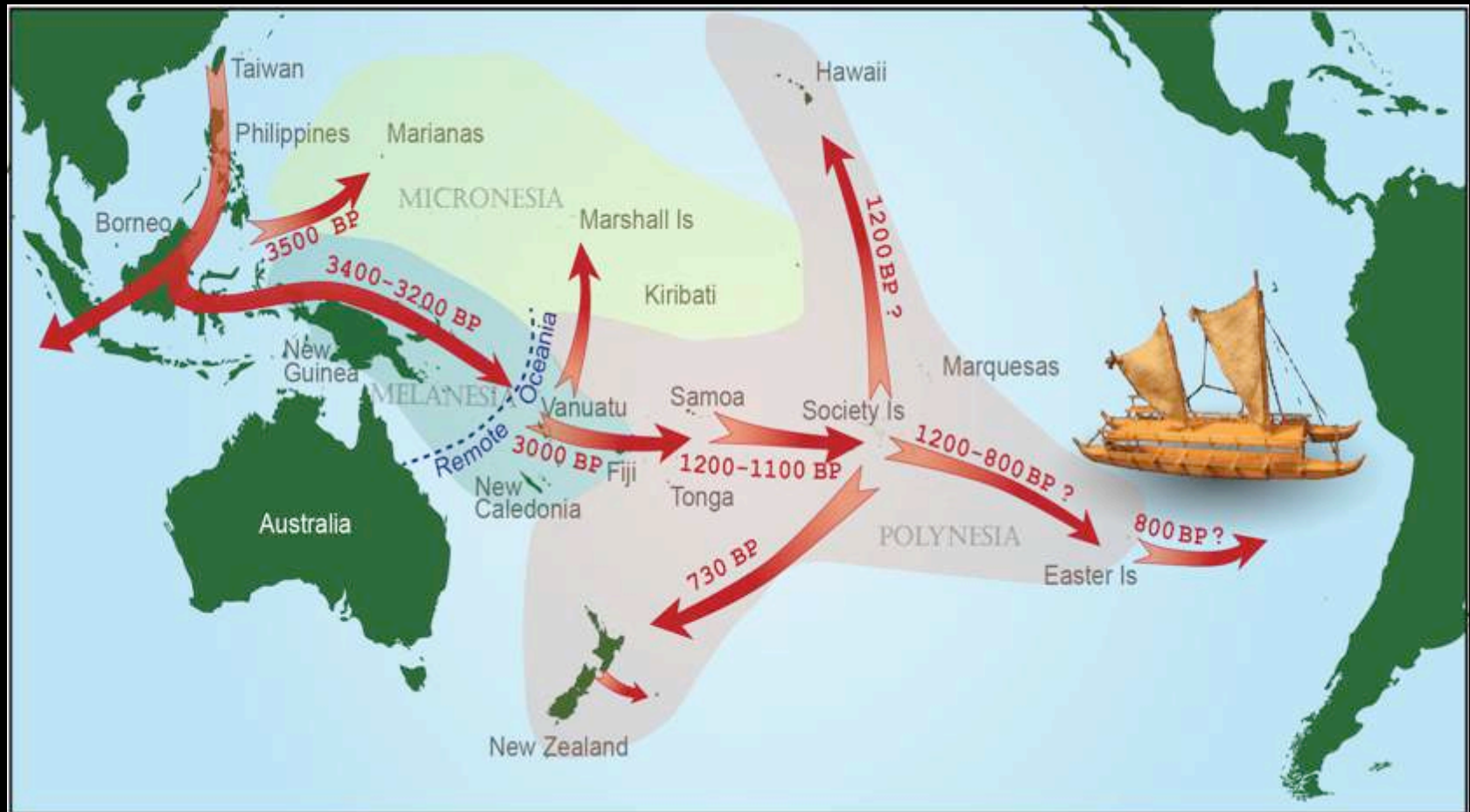
Origins: Austronesian Languages

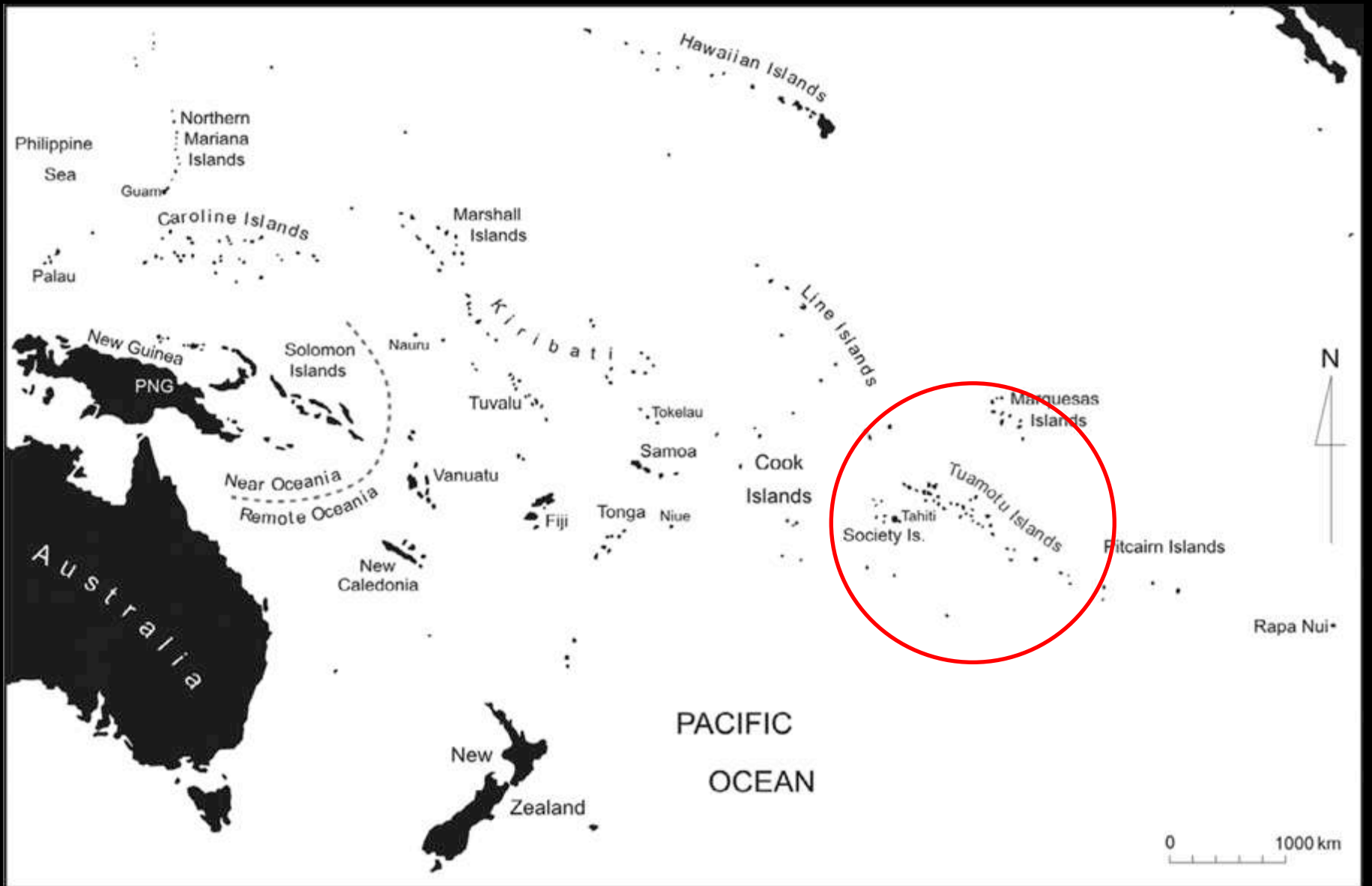


“Out of Taiwan” model for Lapita/Polynesian origins

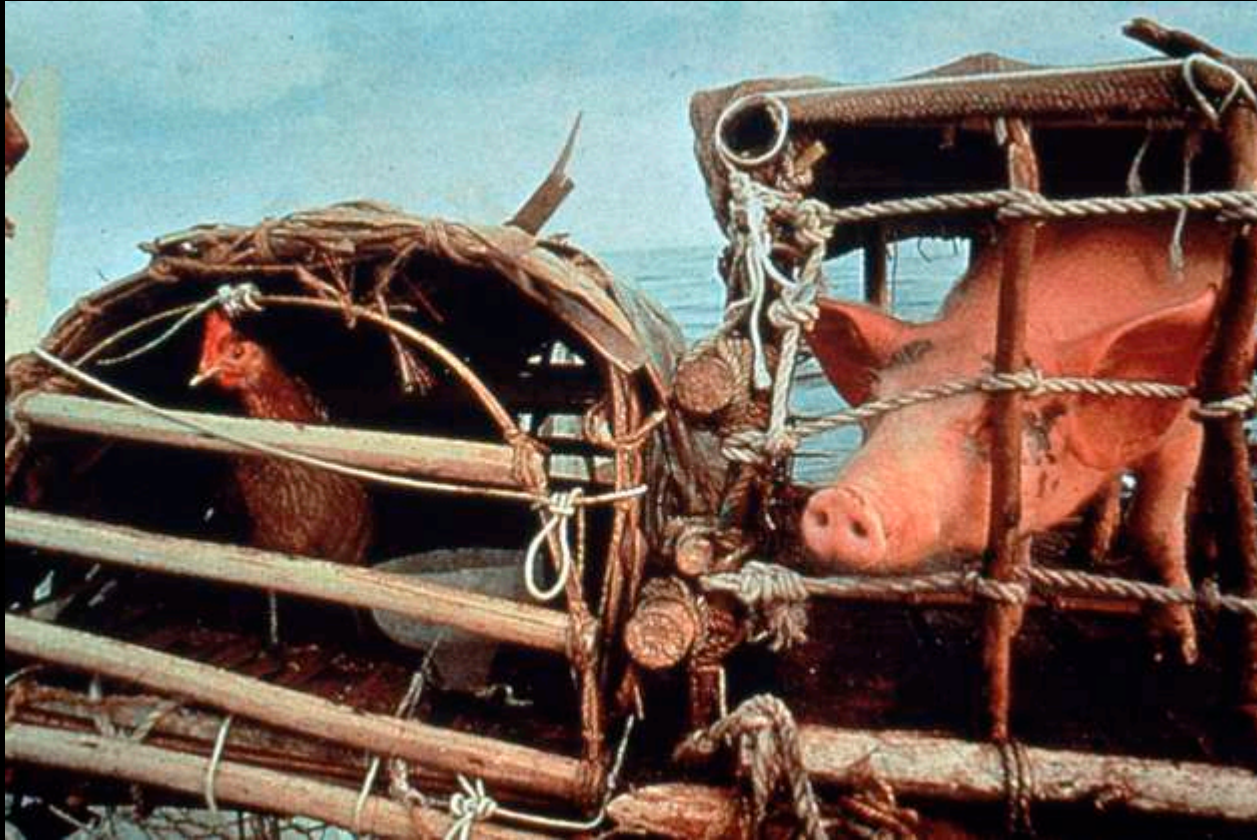
“How shall we account for this Nation spreading itself so far over this vast ocean?”

Capt. James Cook, 1778





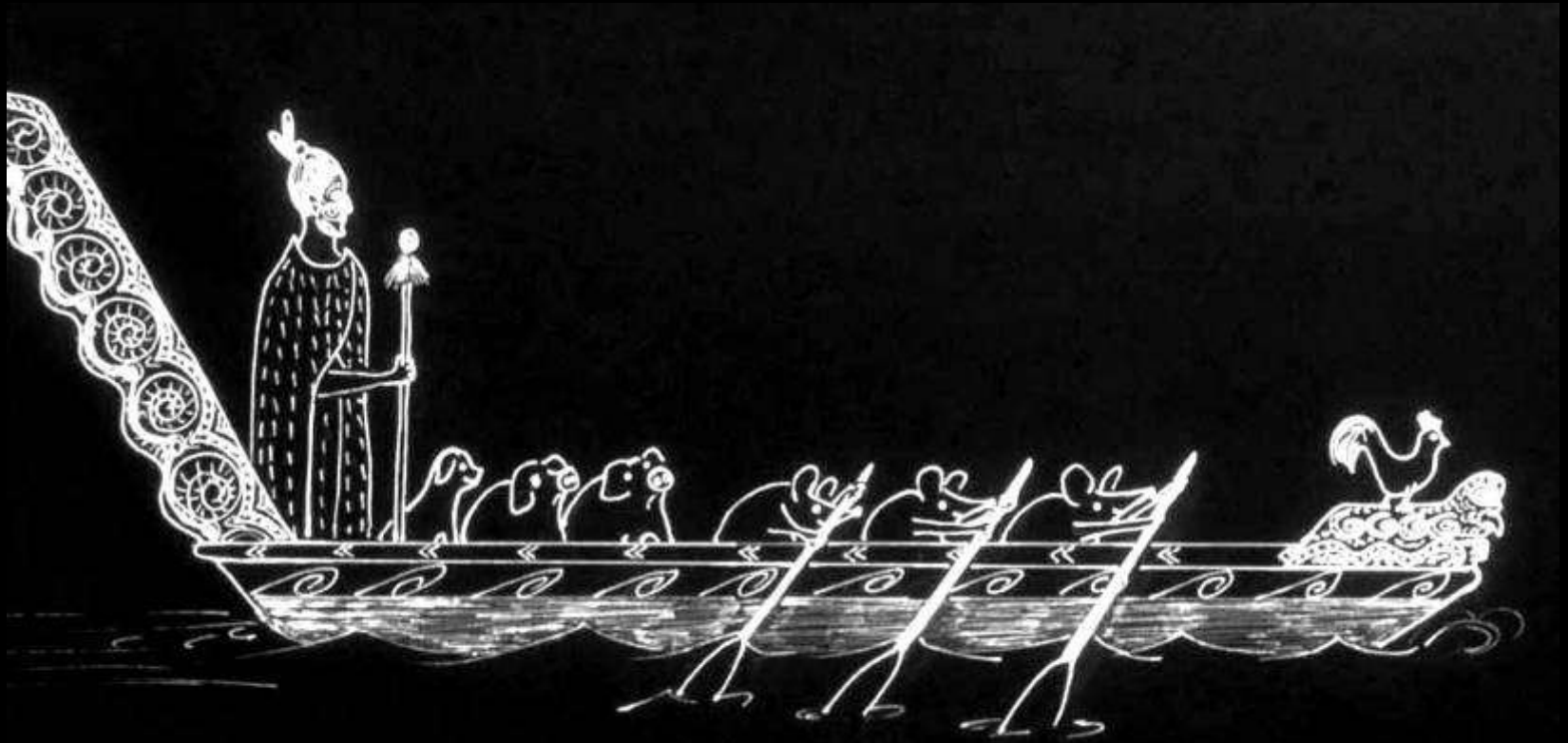
Transported Landscapes



http://archive.hokulea.com/images/ike/voyaging_food_animals.jpg

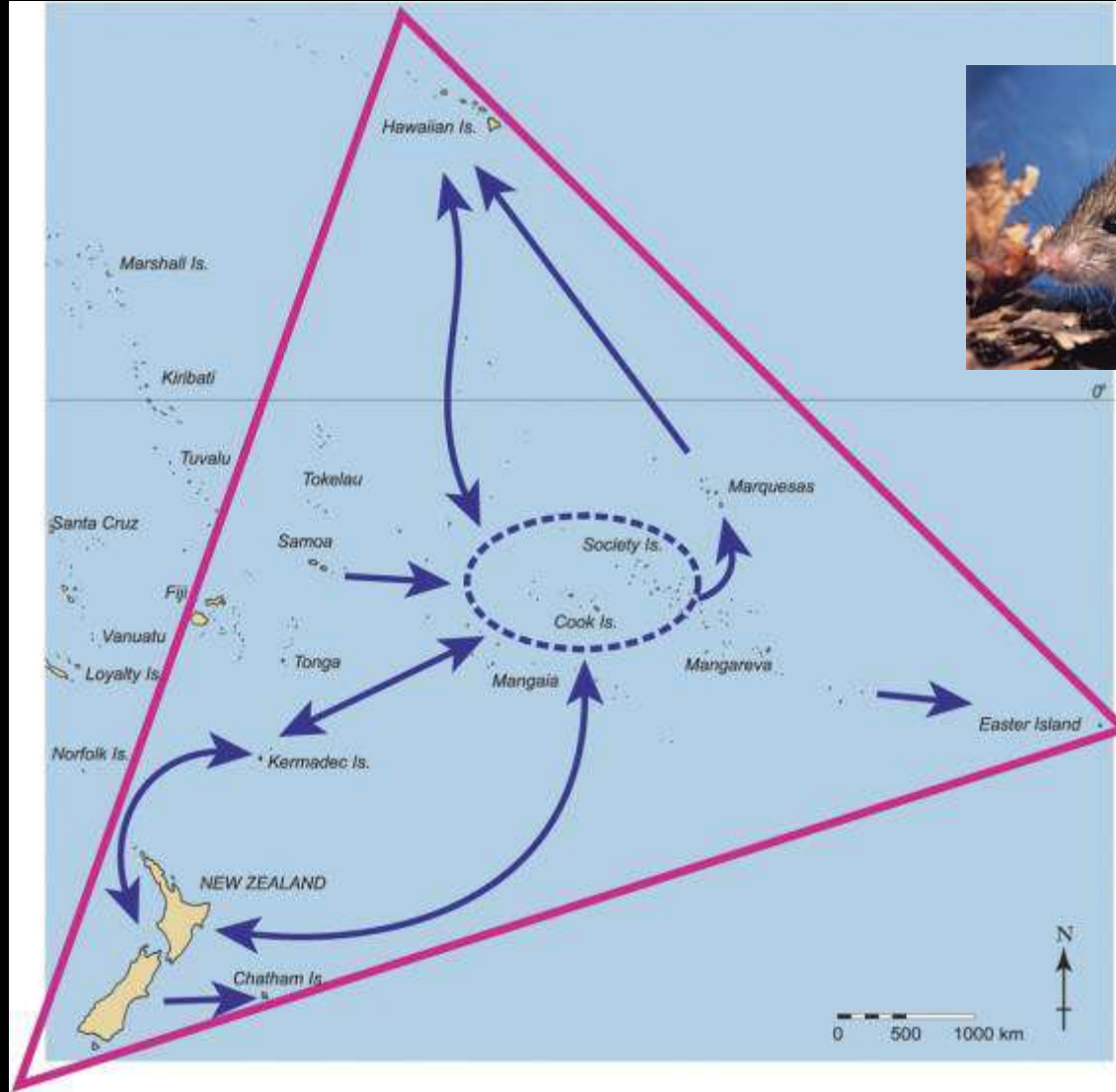
Lapita peoples carried important plants and animals in their canoes and introduced these to the Pacific islands they settled

The commensal Model



Using animals as a proxy for tracing human migration pathways

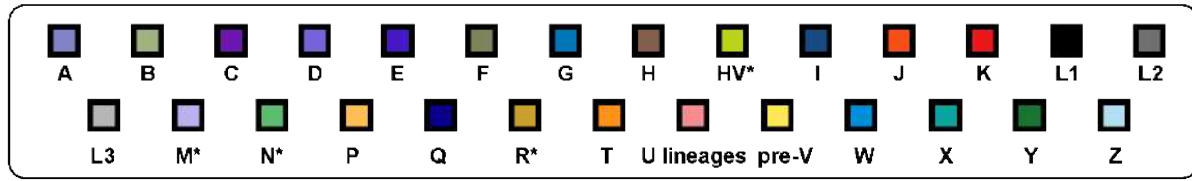
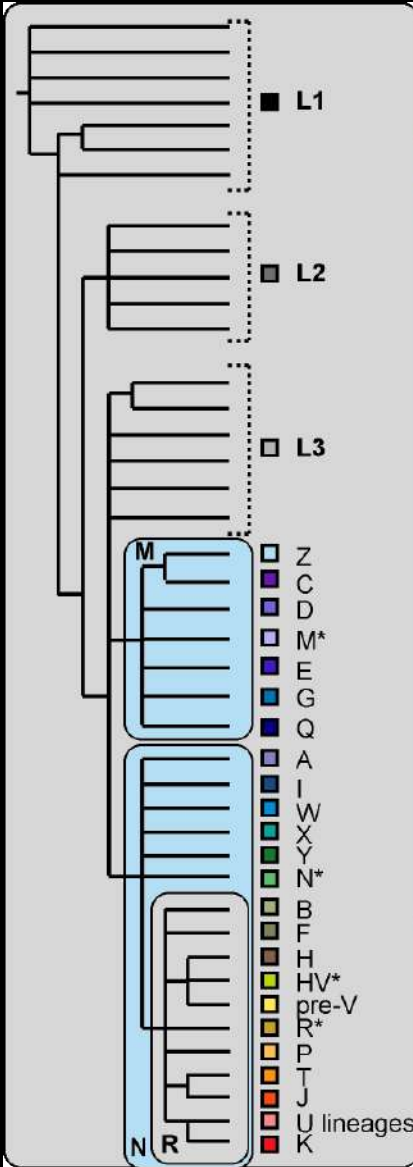
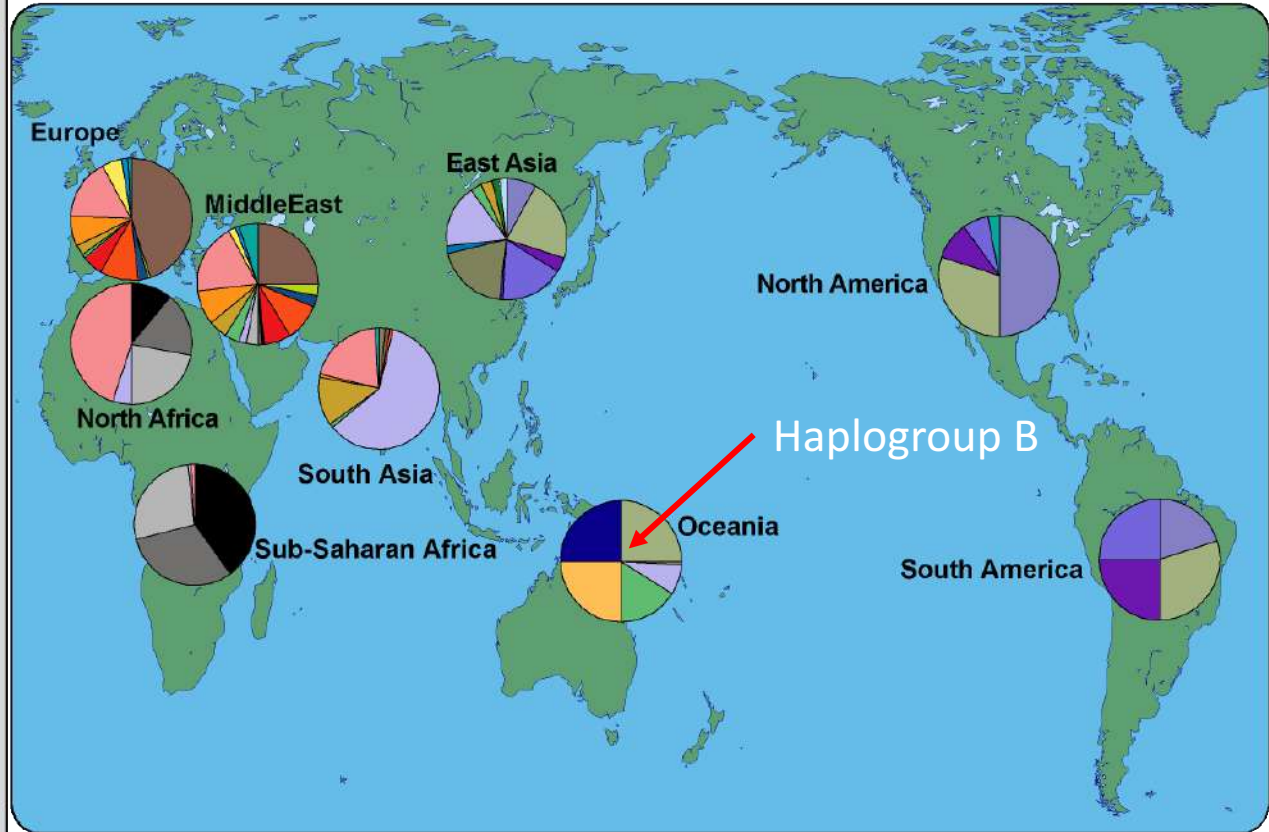
The Kiore (rat) Story: According to mtDNA



Matisoo-Smith et al. 1998
PNAS 95(25):15145-15150

Human mtDNA

mtDNA haplogroup distribution

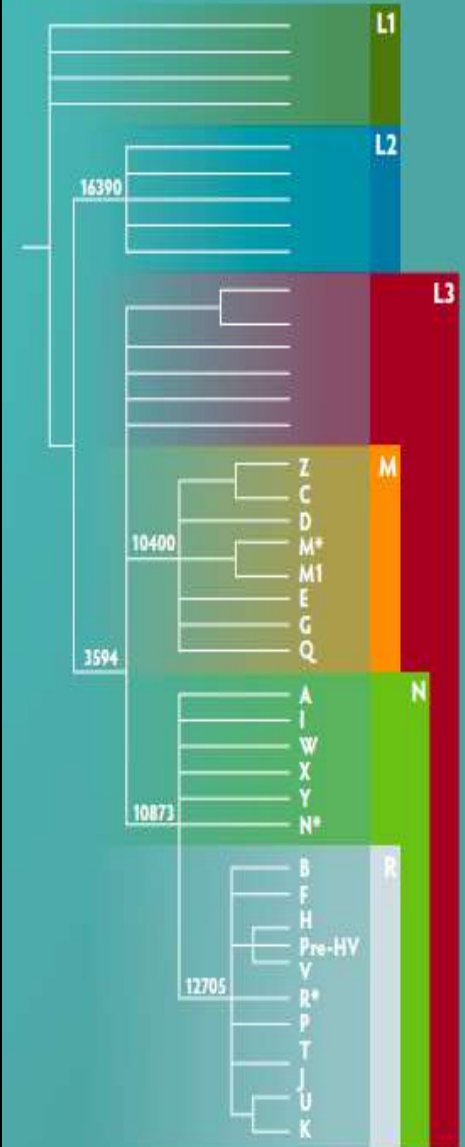


Mitochondrial DNA (mtDNA)

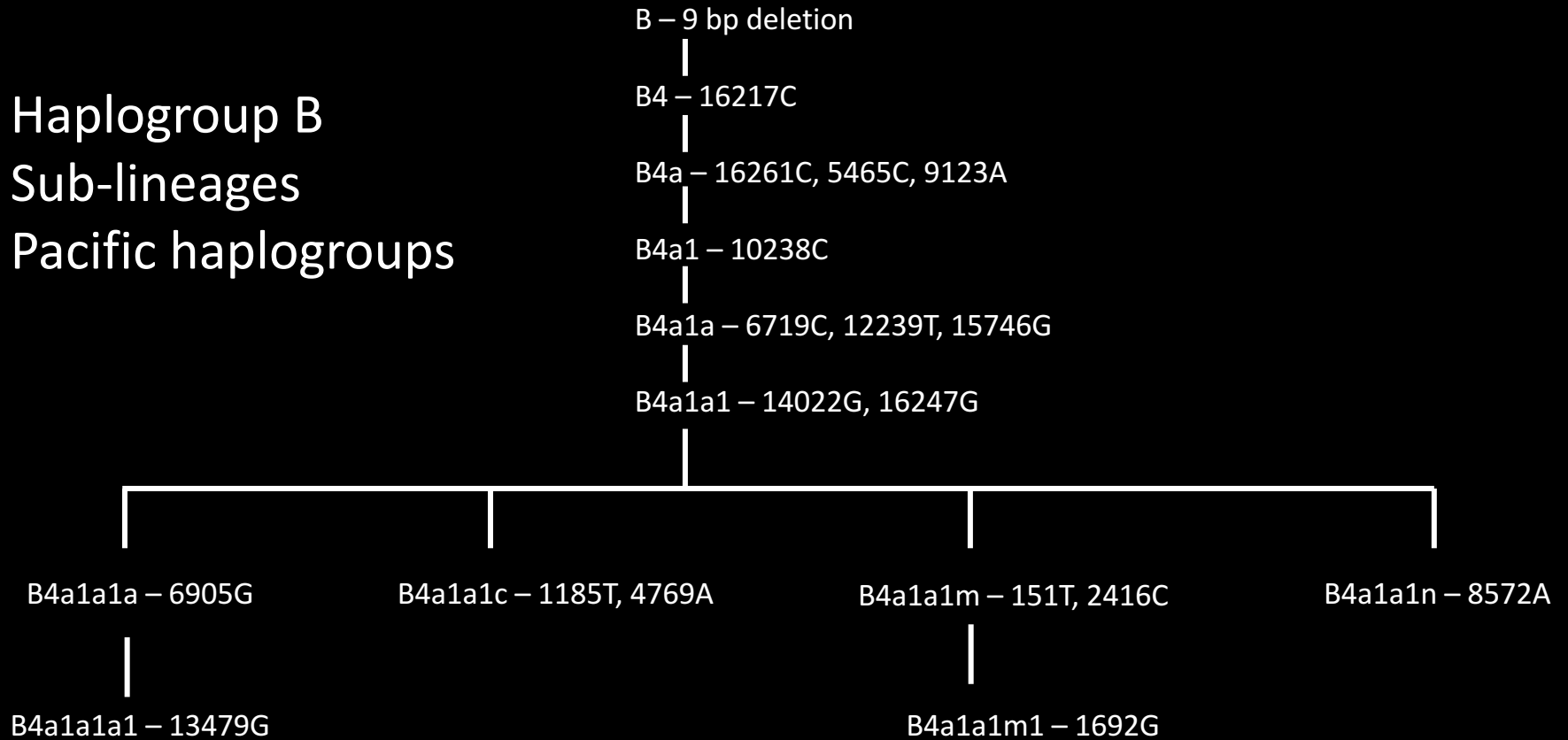


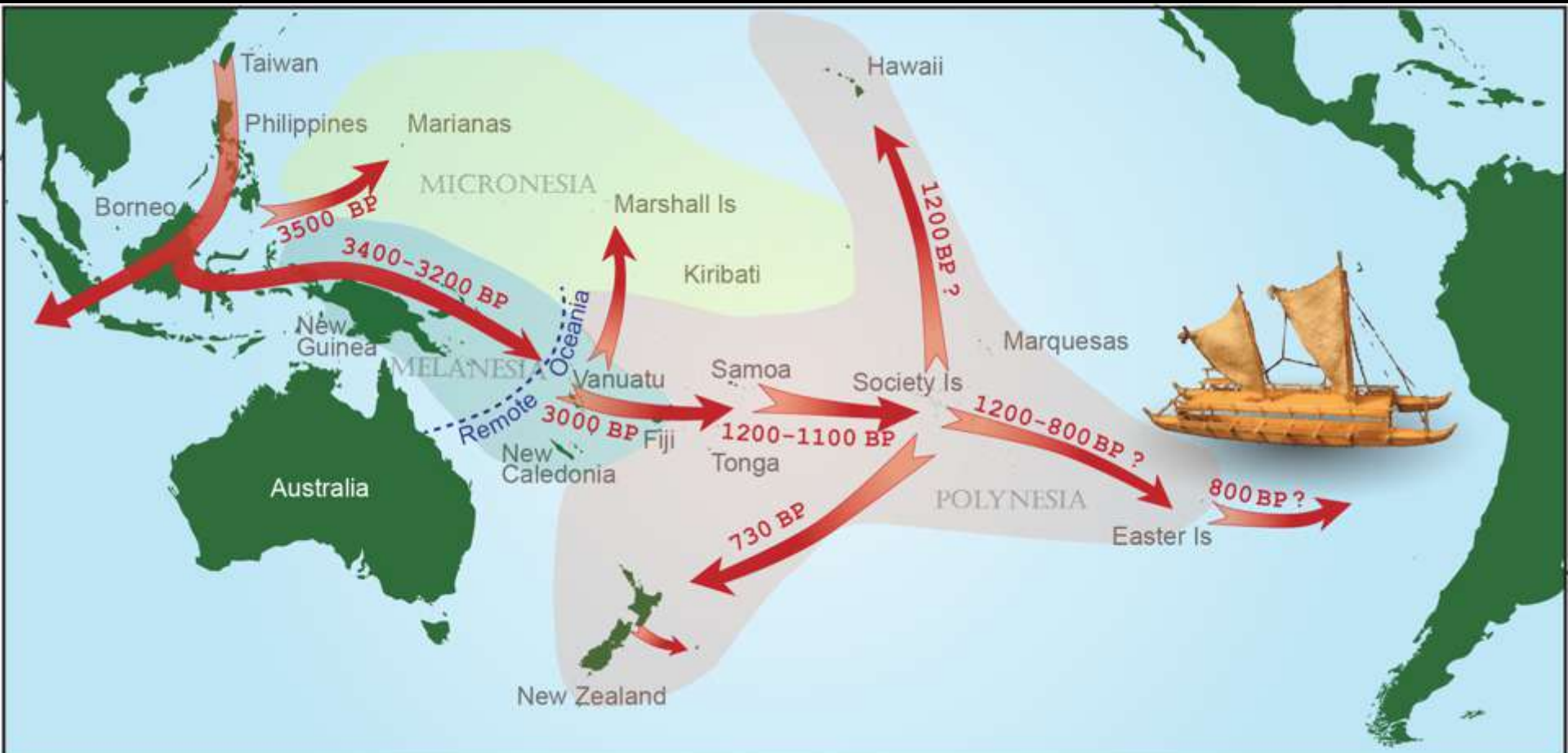
Haplotypes belonging to P, Q, S and some M lineages (M27, M28, M29) represent these early migrations into Sahul and Near Oceania (50,000-30,000 BP)

Mitochondrial DNA (mtDNA): This is maternally inherited and allows us to identify the ancestral migratory origins of your direct maternal line.

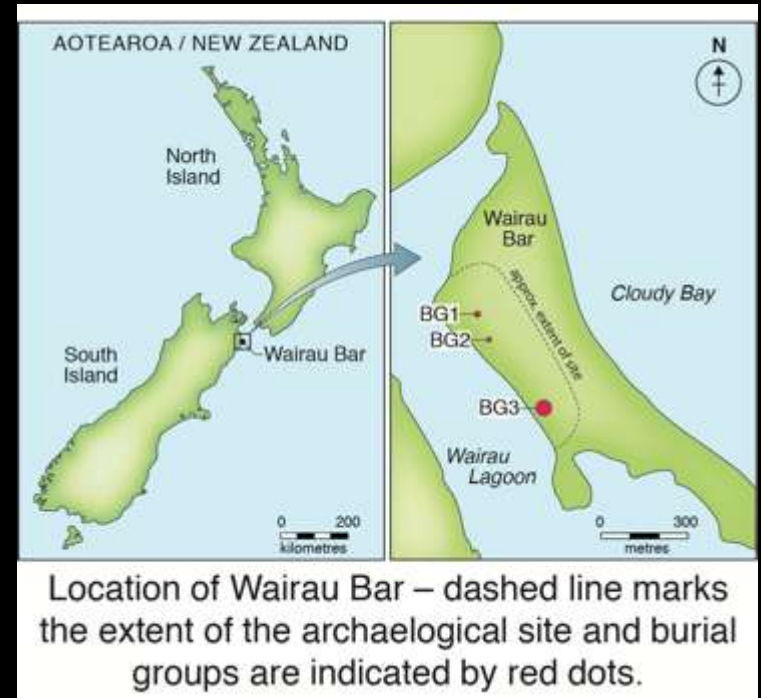


Haplogroup B
Sub-lineages
Pacific haplogroups





Wairau Bar



- One of the earliest archaeological sites in NZ
- Dates to about 750 years ago
- Occupation site with burials
- We have found many mitochondrial DNA lineages which suggests that there were many colonists

An inaccurate depiction of the colonization “event”



L J Steele & C F Goldie: The Arrival of the Maoris in New Zealand (1898)
Auckland Art Gallery Toi o Tāmaki, gift of the late George and Helen Boyd, 1899

European Arrival in the Pacific



Capt. James Cook

- 1700s
- Spanish, Dutch, French, English, German, American
- Explorers, sealers, whalers, missionaries
- Followed by miners, traders, gum diggers
- 1960s Pacific Island migrations

THE LONGEST JOURNEY:



*Africa
to Aotearoa*

(A Genetic Ancestry Study of New Zealand)

The Right Honourable Sir Jerry Mateparae Maternal Haplogroup B4a1a1



MtDNA Haplogroups in British Isles

MtDNA frequencies by region

Region/Haplogroup	L	HV	H	H1+H3	H5	HV0+V	J	T1	T2	U2	U3	U4	U5	U	K	I	W	X	Other	Size
England	0.2	0	44.7	(20)	(4.1)	3.2	11.5	1.6	6.2	1.5	0.6	2.2	9.1	2.7	7.8	4	1.2	1.6	1.9	2333
Ireland	0	1.3	44.1	(22.5)	(1.3)	5.7	10.7	1.3	5.4	1.3	1	1.3	8.4	0.3	12	3	2.3	0.7	1.2	299
Scotland	0	0.2	44.1	(25)	(3.1)	3	12.7	2.2	5.9	1.2	1.1	2.8	8.1	2.4	6.9	4.1	0.6	2.5	2.4	1853
Wales	0	0	59.8		(8.7)	4.3	15.3	2.2	1.1	0	0	0	4.4	0	7.6	3.3	0	1.1	0.9	92

44-59% Haplogroup H

10-15% Haplogroup J

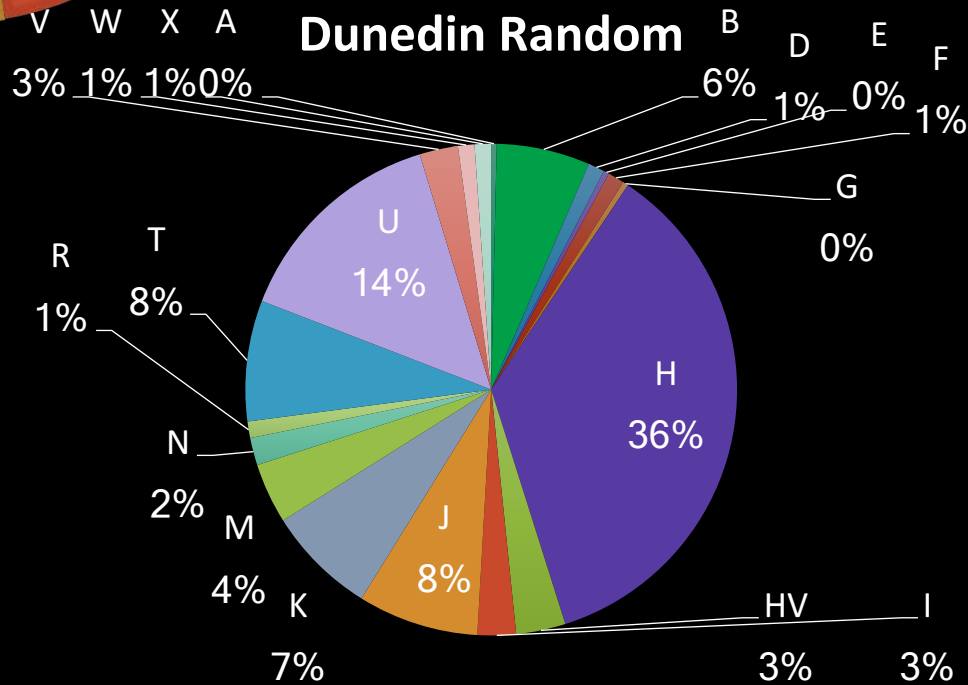
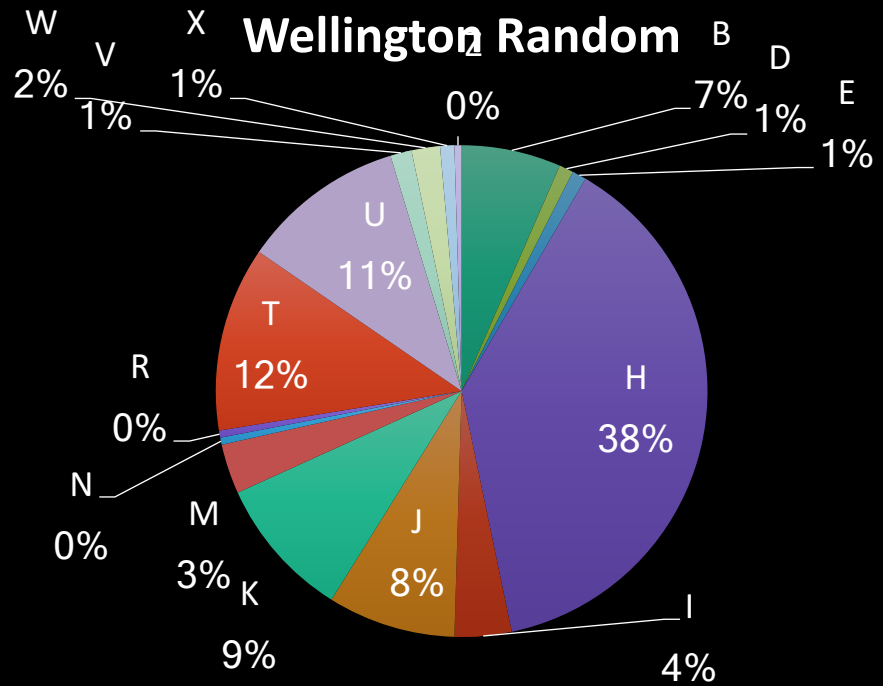
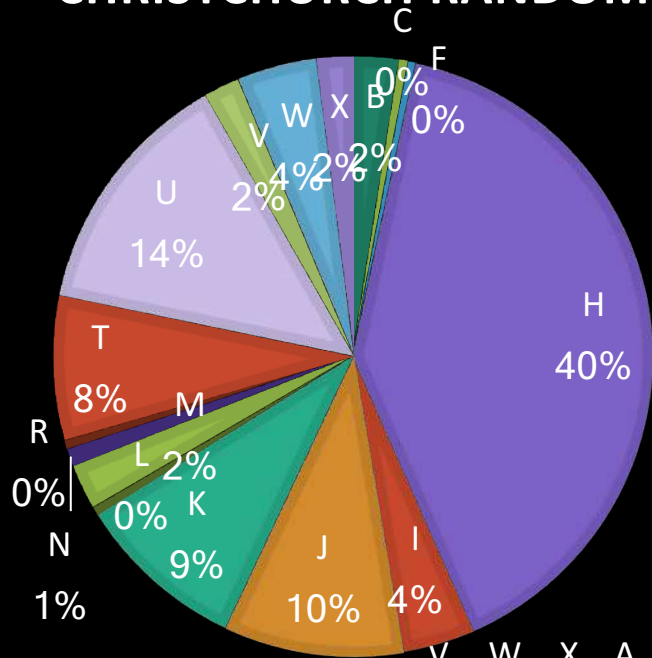
7-12% Haplogroup K

5-9% Haplogroup U5, 2-3% other U

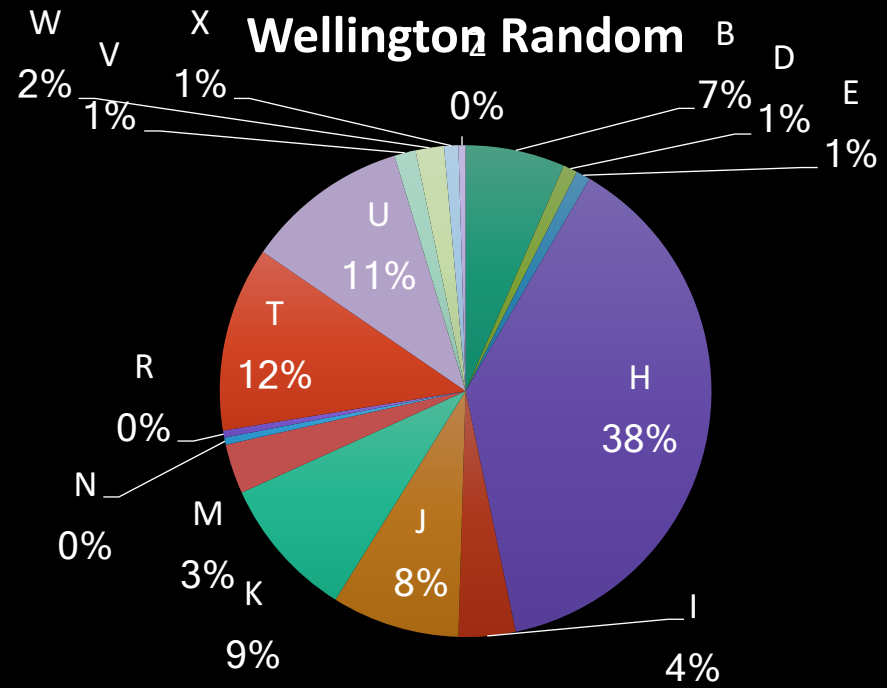
1-5% Haplogroup T2

3-4% Haplogroup I

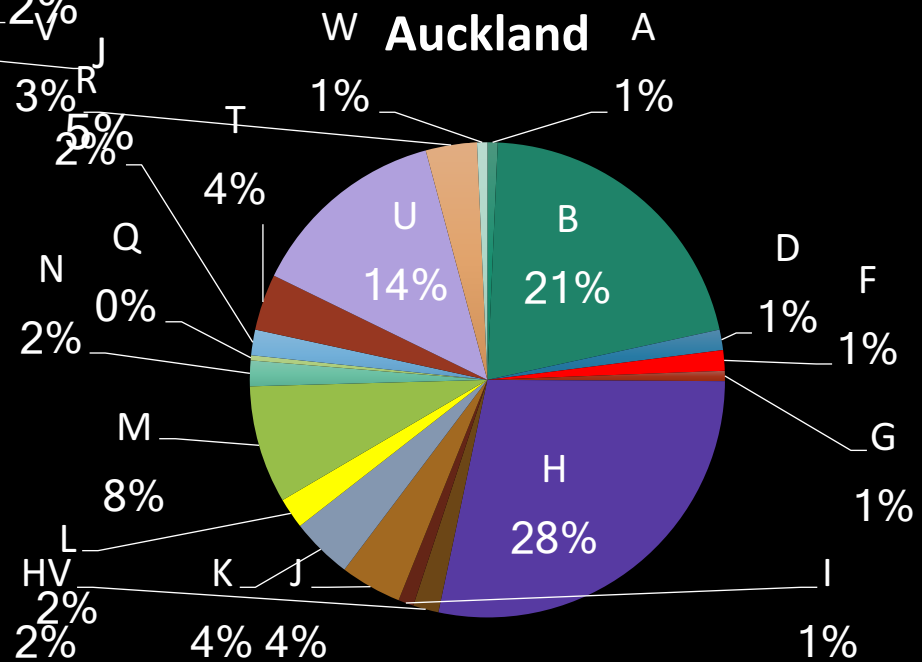
CHRISTCHURCH RANDOM



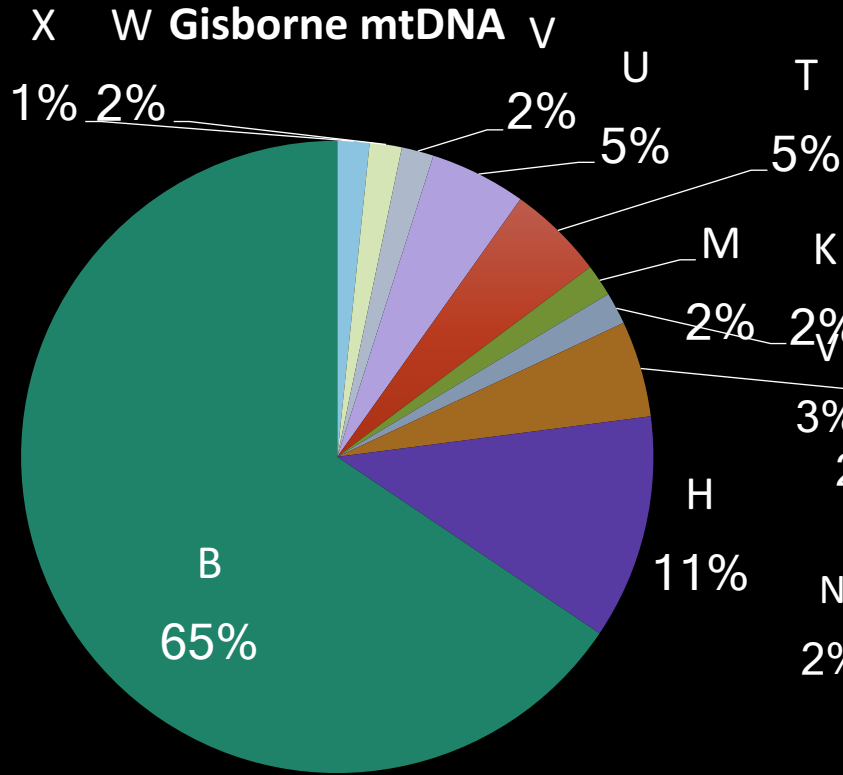
Wellington Random



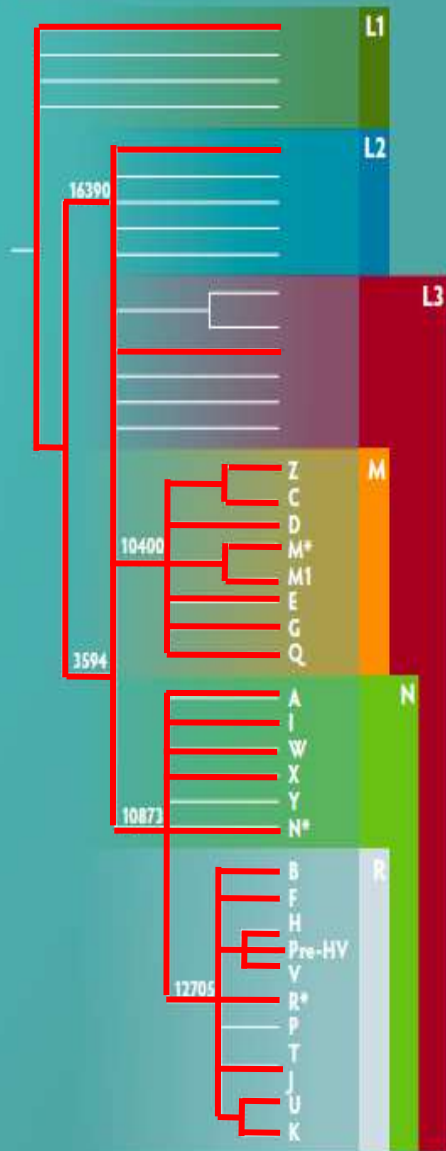
Auckland



Gisborne mtDNA



Mitochondrial DNA (mtDNA): This is maternally inherited and allows us to identify the ancestral migratory origins of your direct maternal line.



New Zealanders:
Many people, many
journeys!

Our analyses have
identified almost all
major mtDNA lineages
(red branches are all
present in NZ)